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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/539,604

06/17/2005

Peter Schoubye

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DICKSTEIN SHAPIRO LLP
1825 EYE STREET NW
Washington, DC 20006-5403

EXAMINER

WU, IVES J

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

11/17/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/539,604	Applicant(s) SCHOUBYE ET AL.	
	Examiner IVES WU	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

(1). Applicants' Amendments and Remarks filed on 5/5/2009 have been received.

Claim 1 is amended.

The rejection of claims 1-4 in prior Office Action dated 9/8/2008 is withdrawn in view of the present Remarks.

However, a new ground of rejections for claims 1-4 is introduced as follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

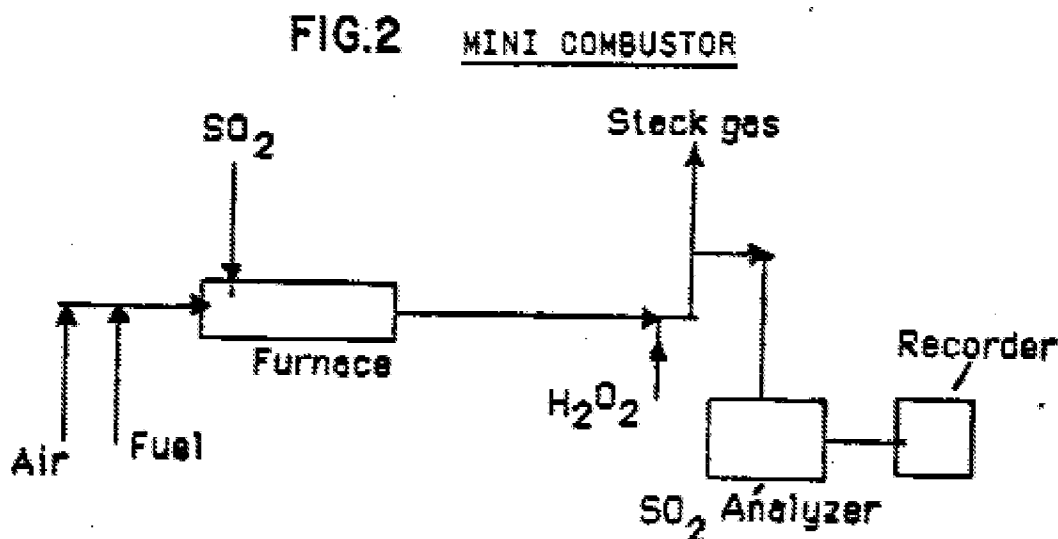
The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(2). **Claims 1-4** are rejected under 35 U.S.C. 103(a) as being unpatentable over Diep (US 4678481) in view of Schoubye (US 5108731A), evidenced by Thirion (US 3953578), Hakka et al (US 5017350).

As to a process for removal in off-gases having a temperature 30-150 °C and containing 0.001 – 1 vol % SO₂ comprising step of oxidizing SO₂ to H₂SO₄ without the use of an absorption tower by spraying an aqueous solution of H₂O₂ into the off-gas upstream to form H₂SO₄ by reaction in the gas phase between SO₂ and H₂O₂ in **independent claim 1**, Diep (US 4678481) discloses H₂O₂ as a conditioning agent for electrostatic precipitators (Title). It relates to the discovery that with small dosage of hydrogen peroxide (10-50 ppm), the amount SO₃/H₂SO₄ in the flue gas can be increased effectively by oxidizing the existing sulfur dioxide (SO₂) to

$\text{SO}_3/\text{H}_2\text{SO}_4$ without introducing additional sulfur sources (Col. 1, line 18-23). The peroxide effectively and efficiently converts the SO_2 to SO_3 when the flue gas is at temperature of about 300° to $400^\circ \text{F} = 134$ to 184°C (Col. 1, line 41-43). As illustrated in Example of Bench Mini-scrubber, it demonstrates the flow of 12 SCFH of diluted SO_2 (3000 ppm) which is $\sim 0.3 \text{ vol}\%$ approximately. As shown in the Figure 2, H_2O_2 solution was sprayed at the inlet of the stack gas (Col. 2, line 48-49). It would form the sulfuric acid by reaction in the gas phase between SO_2 and H_2O_2 as evidenced by Thirion (US 3953578) that sulphuric aerosol is produced in the gaseous phase by the action of sulphurous anhydride on hydrogen peroxide vapor (Col. 4, line 62-64).



As to step of removing the produced sulphuric acid from off-gas in an aerosol filter in **independent claim 1**, as shown in the Figure 2 above, Diep **does not teach** the aerosol filter as claimed.

However, Schoubye (US05108731A) **teaches** filter in sulfuric acid process and apparatus (Title). An important method is to achieve a reduction of the escape of acid mist by passing the gas leaving each tube through an aerosol filter in gastight connection with the tube top (Abstract, line 10-14). Also evidenced by Hakka et al (US05017350) that, generally a coalescing means is provided at the exit from the contact zone to remove substantially all remaining, entrained liquid sorbent from the gases. Suitable coalescing means include demisters, centrifugal fans, chevrons and the like (Col. 6, line 5-10)

The advantage of using filter is to reduce the amount of acid mist escaping to environment to meet the continually increasing demands on environmental regulations and the sulfuric acid recovered is highly pure and highly concentrated (Abstract, line 8-10, 21-22).

Therefore, it would have been obvious at time of the invention to install the filter of Schoubye before the gaseous stream discharged as shown in Figure 2 in the teaching of Diep in order to attain the above-cited advantage.

As to in which a wet electrostatic separator is used in place of an aerosol filter in **claim 3**, Diep (US 4678481) discloses the ESP downstream of contact area as shown in Figure 3.

As to off-gas being cooled by evaporation of the water comprised in the solution being sprayed into the off-gas upstream of the filter in **claim 2**, in view of substantially identical process disclosed by prior arts and by applicants, the cooling effect would occur in the process of prior art.

As to off-gas having a temperature of 50-120° C and contains 100-1000 ppm SO₂ in **claim 4**, in absence of showing the criticality of records, the optimized temperature range from 50 to 120 degree C for off-gas containing 100 to 1000 ppm of SO₂ renders prima facie obvious within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

Response to Arguments

Applicant's arguments, see page 3-5, Remarks, filed 5/5/2009, with respect to the rejection(s) of claim(s) 1 under Muceniaks (GB 1499536) for the issue of forming sulfuric acid in gaseous phase have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Diep (US 4678481), Schoubye (US 5108731A).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner: Ives Jan-Fan Wu

Date: November 11/12/2009

/Duane Smith/

Supervisory Patent Examiner, Art Unit 1797